

1. A current amplifier cell, comprising:

an input stage suitable for accepting an input signal;

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an output stage that generates a first output signal and a second output signal, wherein the second output signal can be used as a feedback signal in an application into which the current amplifier cell may be placed; and

10 a gain stage intermediate and coupled to the input and output stages that isolates the input stage, said gain stage configured in a current mirror configuration and having equivalent current potential through the current mirror configuration so as to cause the first and second output signals to have the same current potential.

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2. The current amplifier cell of claim 1, wherein the input stage further comprises:

a first transistor having a control terminal and first and second terminals;

20 a second transistor having a control terminal and first and second terminals; and

a current source having a first terminal and a second terminal;

25 wherein the first and second transistors are coupled at their control terminals to receive the input signal, the first terminals of the first and second transistors are coupled to the first terminal of the current source, the second terminal of the

current source is coupled to a first voltage potential, and the second terminals of the first and second transistors are coupled to the gain stage.

3. The current amplifier cell of claim 2, wherein the gain stage further comprises:

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a current mirror coupled to the input stage, said current mirror comprising:

a third transistor having a control terminal, a first terminal, and a second terminal;
and

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a fourth transistor having a control terminal, a first terminal, and a second terminal;

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wherein the second terminal of the first transistor is coupled to the first terminal of the third transistor and to the output stage of the current amplifier cell, the second terminal of the second transistor is coupled to the first terminal of the fourth transistor, the control terminal of the third transistor is coupled to the control terminal of the fourth transistor and the first terminal of the fourth transistor, and the second terminals of the third and fourth transistors are coupled to a constant voltage source and to the output stage of the current amplifier cell.

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4. The current amplifier cell of claim 1, wherein the gain stage further comprises:

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a current mirror coupled to the input stage, said current mirror

comprising:

a first transistor having a control terminal, a first terminal, and a second terminal; and

5 a second transistor having a control terminal, a first terminal, and a second terminal;

wherein the second terminal of the first transistor is coupled to the input stage and to the output stage of the current amplifier cell, the first terminal of the second transistor is coupled to the input stage, the control terminal of the first transistor is coupled to the control terminal of the second transistor and the first terminal of the second transistor, and the second terminals of the first and second transistors are coupled to a constant voltage source and to the output stage of the current amplifier cell.

155. The current amplifier cell of claim 3, wherein the output stage further comprises:

a current mirror coupled to the gain stage, said current mirror comprising:

20 a fifth transistor having a control terminal, a first terminal, and a second terminal;

a sixth transistor having a control terminal, a first terminal, and a second terminal; and

25 a capacitive element;

wherein the control terminal of the fifth transistor is coupled to the second terminal of the first transistor and to the first terminal of the capacitive element, the second terminal of capacitive element is coupled to a first voltage potential, and the second terminal of the fifth transistor is coupled to the second terminal of the sixth transistor, the second terminal of both transistor and transistor are coupled to the second terminal of transistor and the second terminal of transistor, the control terminal of the fifth transistor is coupled to the control terminal of the sixth transistor, the first terminal of the fifth transistor is coupled to the first terminal of a current source, the second terminal of current source is coupled to a constant voltage potential, the first terminal of transistor is coupled to the first terminal of a current source, the second terminal of current source is coupled to the first voltage potential, an output originates between the first terminal of the fifth transistor and the first terminal of the current source, and an output originates between the first terminal of the sixth transistor and the first terminal of the current source.

6. The current amplifier cell of claim 1, wherein the output stage further comprises:

a current mirror coupled to the gain stage, said current mirror comprising:

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a first transistor having a control terminal, a first terminal, and a second terminal;

a second transistor having a control terminal, a first terminal, and a second terminal; and

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a capacitive element;

wherein the control terminal of the first transistor is coupled to the input stage and to the first terminal of the capacitive element, the second terminal of capacitive element is coupled to a first voltage potential, and the second terminal of the first transistor is coupled to the second terminal of the second transistor,
5 the second terminal of both transistor and transistor are coupled to the gain stage, the control terminal of the first transistor is coupled to the control terminal of the second transistor, the first terminal of the first transistor is coupled to the first terminal of a current source, the second terminal of current source is coupled to a constant voltage potential, the first terminal of transistor is coupled to the first terminal of a current source, the second terminal of current source is coupled to the first voltage potential, an output originates between the first terminal of the first transistor and the first terminal of the current source, and an output originates between the first terminal of the second transistor and the first terminal of the current source.

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16 7. The current amplifier cell of claim 6, wherein the input signal provided to the input stage is obtained by coupling a first input terminal of the input stage to the first voltage potential and coupling a second input terminal of the input stage to a current source and wherein a gain of the first output signal is determined in accordance with a resistive element coupled to the second output signal.

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25 8. The current amplifier cell of claim 7, wherein the first input terminal of the input stage is the control terminal of the first transistor and the second input terminal of the input stage is the control terminal of the second transistor, and wherein the resistive element comprises:

a first resistor coupled to the control terminal of the second transistor, the current source, and the output stage; and

5 a second resistor coupled between the second output signal and the first voltage potential.

9. The current amplifier cell of claim 8, wherein the gain of the second output signal is a real value.

10 10. A current amplifier, comprising:

a current amplifier cell, comprising:

15 an input stage suitable for accepting an input signal;

an output stage that generates a first output signal and a second output signal, wherein the second output signal is operable as a feedback signal in an application into which the current amplifier cell may be placed; and

20 a gain stage intermediate and coupled to the input and output stages that isolates the input stage, said gain stage configured in a current mirror configuration and having equivalent current potential through the current mirror configuration so as to cause the first and second output signals to have the same current potential;

25 a current source coupled to a negative terminal of the current amplifier cell;

a first resistive element coupled between the second output signal of the current amplifier cell, and the negative terminal of the current amplifier cell; and

5 a second resistive element coupled between the second output signal of the current amplifier cell, and a voltage potential.

10 11. The current amplifier cell of claim 1, wherein the input signal provided to the input stage is obtained by applying a first voltage potential between a first input terminal of the input stage and a second voltage potential, and coupling a second input terminal of the input stage to a first output of the output stage, and controlling the gain of a second output by connecting the first output of the output stage to a resistive element which is coupled to a third voltage potential.

15 12. The current amplifier cell of claim 6, wherein the input signal provided to the input stage is obtained by applying a first voltage potential between a first input terminal of the input stage and a second voltage potential, and coupling a second input terminal of the input stage to a first output of the output stage, and controlling the gain of a second output by connecting the first output of the output stage to a resistive element which is coupled to a third voltage potential.

20 13. The current amplifier cell of claim 12, wherein the first input terminal of the input stage is the control terminal of the first transistor and the second input terminal of the input stage is the control terminal of the second transistor, and wherein the resistive element comprises:

25 a resistor coupled to the control terminal of the second transistor, the current source, and the first terminal of the fifth transistor of the output stage.

14. A voltage-to-current converter, comprising:

a current amplifier cell, comprising:

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an input stage suitable for accepting an input signal;

an output stage that generates a first output signal and a second output signal, wherein the second output signal is operable as a feedback signal in an application into which the current amplifier cell may be placed; and

10 a gain stage intermediate and coupled to the input and output stages that isolates the input stage, said gain stage configured in a current mirror configuration and having equivalent current potential through the current mirror configuration so as to cause the first and second output signals to have the same current potential;

15 a voltage potential applied between positive and negative terminals of the current amplifier cell; and

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a resistive element coupled between the first output and a voltage potential;

25 15. The voltage-to-current converter of claim 14, wherein the first output is coupled to the negative input terminal.